



**PERFORMANCE TEST REPORT**

**Rendered to:**

**TUFF COAT MANUFACTURING, INC.**

**PRODUCT: Tuff Coat UT-100F Non-Skid Coating**

**TYPES: Plywood and Aluminum Substrates**

**Report No.: E8672.01-106-31**

**Report Date: 07/28/15**

**Test Record Retention Date: 07/10/19**



## **PERFORMANCE TEST REPORT**

Rendered to:

TUFF COAT MANUFACTURING, INC.  
340 Denny Court, Unit A  
Montrose, Colorado 81401

Report No.: E6872.01-106-31  
Test Start Date: 06/11/15  
Test Completion Date: 07/10/15  
Report Date: 07/28/15  
Test Record Retention Date: 07/10/19

**Products:** Tuff Coat UT-100F Non-Skid Coating

**Types:** Plywood and Aluminum Substrates

**Project Summary:** Architectural Testing, Inc., an Intertek company (“Intertek-ATI”), was contracted by Tuff Coat Manufacturing, Inc. to evaluate their non-skid coating properties on plywood and aluminum substrates. A Tuff Coat UT-100F non-skid coating was applied to plywood for (ASTM D 4060-14 abrasion testing) and aluminum substrates for (ASTM D 543-14 reagent testing).

**Test Methods:** The test specimens were evaluated in accordance with the following methods.

ASTM D 543-14, *Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents*. (Practice A - Procedure I, Immersion with Weight and Dimension Changes).

ASTM D 4060-14, *Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser*.

**Test Procedures and Test Results:** The test procedures and test results are reported below.

For the reagent testing (*ASTM 543-06, Practice A*), twelve specimens were received with ready to test dimensions measuring nominally 1" wide by 2" long. Four reagents were used for testing the Tuff Coat UT-100F non-skid coating samples (*Hydrochloric Acid (10%), Nitric Acid (10%), Sulfuric Acid (Concentrated), & Jet Fuel (jp-4c.)*). Three specimens were assigned to each reagent. Each specimen weight was measured using a Mettler Toledo digital scale (ICN: 65216). Specimen thickness, length and width dimensions were measured using a Digital Caliper (ICN: 324). The exposure specimens were suspended inside a glass jar containing the reagent. The specimens were exposed to the reagent for seven days at standard laboratory temperature 70°F ±4°. After the exposure period, specimens were re-weighed and dimensionally inspected for comparison to pre-exposure values. For the abrasion testing (*ASTM D 4060-14*), specimens were placed on a Taber Abraser Machine (ICN: Y001522), which applied a constant downward force of 1000 grams to each of two Calibrase CS-10 Taber Industries abrasive wheels, while the instrument recorded the number of wear cycles completed by the sample, as it rotated below the wheels. Each specimen was evaluated after 1,000 cycles of abrasion by weight measurement and visible wear through. The samples were 4" square by nominally 3/8" thick specimens. (See photos in Appendix A). Individual test results are reported in the following tables.

**ASTM D54-06, Practice A - Procedure I  
Reagent Test - Hydrochloric Acid**

		<b>Specimen 1</b>	<b>Specimen 2</b>	<b>Specimen 3</b>
<b>Mass (g)</b>	<b>Before Immersion</b>	6.628	6.870	6.051
	<b>After Immersion</b>	6.197	6.327	5.745
	<b>Change</b>	-0.431	-0.543	-0.306
	<b>Percentage Change</b>	<b>-6.5%</b>	<b>-7.9%</b>	<b>-5.1%</b>
<b>Thickness (in)</b>	<b>Before Immersion</b>	0.140	0.153	0.145
	<b>After Immersion</b>	0.137	0.146	0.122
	<b>Change</b>	-0.003	-0.007	-0.023
	<b>Percentage Change</b>	<b>-2.1%</b>	<b>-4.6%</b>	<b>-15.9%</b>
<b>Length (in)</b>	<b>Before Immersion</b>	1.960	2.137	2.195
	<b>After Immersion</b>	1.946	2.105	2.192
	<b>Change</b>	-0.014	-0.032	-0.003
	<b>Percentage Change</b>	<b>-0.7%</b>	<b>-1.5%</b>	<b>-0.1%</b>
<b>Width (in)</b>	<b>Before Immersion</b>	1.016	1.035	1.044
	<b>After Immersion</b>	1.008	1.003	1.005
	<b>Change</b>	-0.008	-0.032	-0.039
	<b>Percentage Change</b>	<b>-0.8%</b>	<b>-3.1%</b>	<b>-3.7%</b>

Test Procedures and Test Results: (Continued)

Reagent Test - Nitric Acid

		Specimen 1	Specimen 2	Specimen 3
Mass (g)	Before Immersion	7.324	7.062	7.052
	After Immersion	6.632	6.536	6.822
	Change	-0.692	-0.526	-0.230
	Percentage Change	<b>-9.4%</b>	<b>-7.4%</b>	<b>-3.3%</b>
Thickness (in)	Before Immersion	0.138	0.162	0.143
	After Immersion	0.133	0.161	0.129
	Change	-0.005	-0.001	-0.014
	Percentage Change	<b>-3.6%</b>	<b>-0.6%</b>	<b>-9.8%</b>
Length (in)	Before Immersion	2.074	2.045	2.159
	After Immersion	2.040	1.974	1.142
	Change	-0.034	-0.071	-0.017
	Percentage Change	<b>-1.6%</b>	<b>-3.5%</b>	<b>-0.8%</b>
Width (in)	Before Immersion	1.025	1.027	1.022
	After Immersion	1.008	0.997	1.021
	Change	-0.017	-0.030	-0.001
	Percentage Change	<b>-1.7%</b>	<b>-2.9%</b>	<b>-0.1%</b>

Reagent Test - Sulfuric Acid

		Specimen 1	Specimen 2	Specimen 3
Mass (g)	Before Immersion	6.274	6.791	3.386
	After Immersion	5.525	5.561	5.116
	Change	-0.749	-1.230	-1.270
	Percentage Change	<b>-11.9%</b>	<b>-18.1%</b>	<b>-19.9%</b>
Thickness (in)	Before Immersion	0.147	0.154	0.145
	After Immersion	0.078	0.065	0.078
	Change	-0.069	-0.089	-0.067
	Percentage Change	<b>-46.9%</b>	<b>-57.8%</b>	<b>-46.2%</b>
Length (in)	Before Immersion	2.131	2.078	2.053
	After Immersion	2.110	2.067	2.047
	Change	-0.021	-0.011	-0.006
	Percentage Change	<b>-1.0%</b>	<b>-0.5%</b>	<b>-0.3%</b>
Width (in)	Before Immersion	1.014	1.012	1.006
	After Immersion	0.998	1.003	0.996
	Change	-0.016	-0.090	-0.010
	Percentage Change	<b>-1.6 %</b>	<b>-0.9%</b>	<b>-1.0%</b>

Test Procedures and Test Results: (Continued)

Reagent Test - Jet Fuel jp-4C

		Specimen 1	Specimen 2	Specimen 3
Mass (g)	Before Immersion	6.658	6.539	6.552
	After Immersion	6.150	6.208	6.334
	Change	-0.508	-0.331	-0.218
	Percentage Change	<b>-7.6%</b>	<b>-5.1%</b>	<b>-3.3%</b>
Thickness (in)	Before Immersion	0.168	0.155	0.160
	After Immersion	0.129	0.145	0.131
	Change	-0.039	-0.0100	-0.029
	Percentage Change	<b>-23.2%</b>	<b>-6.5%</b>	<b>18.1%</b>
Length (in)	Before Immersion	2.008	2.091	2.034
	After Immersion	2.002	2.075	2.013
	Change	-0.006	-0.016	-0.021
	Percentage Change	<b>-0.3%</b>	<b>-0.8%</b>	<b>-1.0%</b>
Width (in)	Before Immersion	1.048	1.030	1.042
	After Immersion	1.023	1.011	1.014
	Change	-0.025	-0.019	-0.028
	Percentage Change	<b>-2.4%</b>	<b>-1.8%</b>	<b>-2.7%</b>

ASTM D4060-14, Taber Abrasion Testing

Product ID	Abrasion Cycles	Start Mass (gram)	End Mass (gram)	Observations
Tuff Coat UT-100F Non-Skid Coating				
<b>1</b>	1,000	56.3	56.0	Surface Coating Wear Through 0.5 % Loss of Mass
<b>2</b>	1,000	63.8	63.5	Surface Coating Wear Through 0.4 % Loss of Mass
<b>3</b>	1,000	68.0	67.7	Surface Coating Wear Through 0.4 % Loss of Mass



Intertek-ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI for the entire test record retention period.

Results obtained are tested values and were secured using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimens tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:

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REH:jmb/kf

Attachments (pages)      This report is complete only when all attachments listed are included.  
Appendix A - Photographs (1)

### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	07/28/15	N/A	Original report issue



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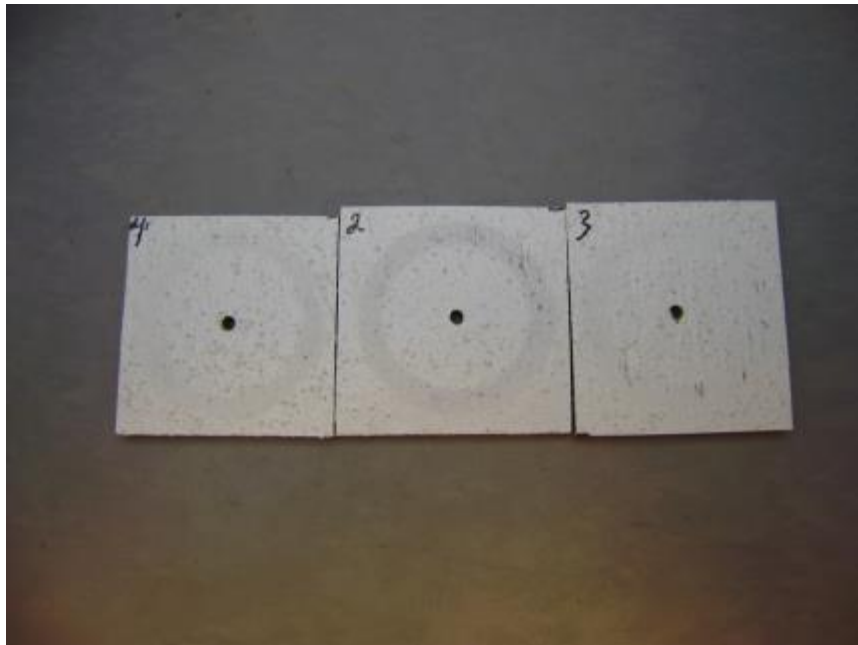
## **APPENDIX A**

### **Photographs**





**Photo No. 1**  
**Tuff Coat UT-100 Samples, Pre-Test ASTM D 4060**



**Photo No. 2**  
**Tuff Coat UT-100 Samples, Post -Test ASTM D4060**